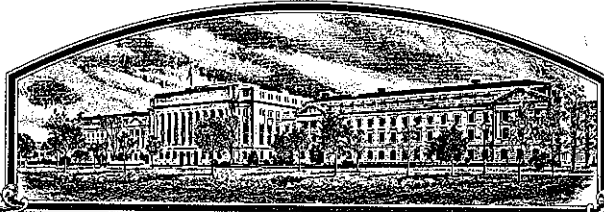


No.

8000131



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Alabama Agricultural Experiment Station-
Department of Horticulture

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (34 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

COWPEA

'Freezegreen'

In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington
this 26th day of March in
the year of our Lord one thousand nine
hundred and eighty-four.

Attest:

Kenneth H. Egan
Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

John R. Block
Secretary of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

FORM APPROVED
OMB NO. 40-R3822

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: See Reverse.

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY <u>Ala. 963.8G1-4</u>		1b. VARIETY NAME <u>Freezegreen</u>		FOR OFFICIAL USE ONLY PV NUMBER 8000131	
2. KIND NAME <u>Southernpea (Cowpea)</u>		3. GENUS AND SPECIES NAME <u>Vigna unguiculata</u>		FILING DATE <u>6/9/80</u>	TIME <u>1:30</u> <u>P.M.</u>
4. FAMILY NAME (BOTANICAL) <u>Leguminosae</u>		5. DATE OF DETERMINATION <u>May 26, 1976</u>		FEE RECEIVED \$ <u>500.00</u> \$ <u>250.00</u>	DATE <u>6/9/80</u> <u>2/15/84</u>
6. NAME OF APPLICANT(S) <u>Horticulture Department</u> <u>Auburn University</u> <u>Agricultural Exper. Sta</u>		7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) <u>Auburn, Alabama 36830</u>		8. TELEPHONE AREA CODE AND NUMBER <u>(205) 826-4862</u> <u>(205) 826-4859</u>	
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (Corporation, partnership, association, etc.) <u>University (State)</u>			10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION <u>Alabama</u>		11. DATE OF INCORPORATION <u>1901</u>
12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS: <u>Oyette L. Chambliss</u> <u>Horticulture Department</u> <u>Auburn University</u> <u>Auburn, Alabama 36830</u>					

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- ☒ 13A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)
- ☒ 13B. Exhibit B, Novelty Statement.
- ☒ 13C. Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.)
- ☐ 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a). (If "Yes," answer 14B and 14C below.) ☒ YES ☐ NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☒ YES ☐ NO

14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED? See as per phone call
☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED 6/19/80

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? ☐ YES ☒ NO (If "Yes," give name of countries and dates.)

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? ☐ YES ☒ NO (If "Yes," give name of countries and dates.)

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? ☒ YES ☐ NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

June 3, 1980
(DATE)

Oyette L. Chambliss
(SIGNATURE OF APPLICANT)

INSTRUCTIONS

GENERAL: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and \$500 fee (\$250 filing fee and \$250 examination fee) to U.S. Dept. of Agriculture, Agricultural Marketing Service, Livestock, Poultry, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (See section 180.175 of the Regulations and Rules of Practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

- 5 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.
- 13a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.
- 13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.
- 13c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.
- 13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as, plant habit, plant color, disease resistance, etc.
- 14a If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "NO," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.)
- 15a See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice.

8000131

Southernpea (cowpea)
'Freezegreen'

13A. Exhibit A:

'Freezegreen' is derived from a single dry seed with a light olive green (10 y 5/5 in the Nickerson color chart) seedcoat discovered in the white-seeded 'Lady' type breeding line, Ala. 963.8. The green seed was apparently a mutant. A single recessive gene (gt = green testa) has been shown to control the green seedcoat character. Ala. 963.8 is of uncertain origin, but it derives from the breeding program of C. L. Isbell. It is thought that the parental background included 'Lady', 'Conch', and possibly some purple hull cultivars. Seed from the single green seeded mutant were grown in isolated increases for four generations and bulked to increase for release. The only variant observed during the time of multiplication was what appeared to be a chimera type of somatic mutation in foliage chlorophyll. Mutant plants occurred at frequencies up to 0.5%. The final increase before release was rogued to remove this variant.

Addendum to Exhibit A

Add to the statement in Exhibit A the following statement:

'Freezegreen' is a stable variety.

13B. Exhibit B,

'Freezegreen' is the only cowpea variety with a seedcoat which remains green when the seed is dry. This green seedcoat persists but will bleach with continued exposure to sunlight. If dry pods remain on the plant in the field for longer periods than one to two weeks considerable loss of green color will occur. The persistent green seedcoat is the key novelty of 'Freezegreen'. However, its plant type, pod type and color, and seed type is also unique. Its plant and pod type most nearly resemble the variety 'Conch'. Pod color is a distinctly different shade of purple from other purple hull varieties. The seed type most nearly resembles the variety 'Lady'. Attached are published materials containing descriptions and comparative data.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
BELTSVILLE, MARYLAND 20705
OBJECTIVE DESCRIPTION OF VARIETY
(Cowpea)

INSTRUCTIONS: See Reverse

NAME OF APPLICANT(S) Horticulture Department, Auburn Univ. Agr. Exper. Sta	VARIETY NAME OR TEMPORARY DESIGNATION Freezegreen
ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code) Auburn, Alabama 36830	FOR OFFICIAL USE ONLY PVPO NUMBER 8000131

Place the appropriate number that describes the varietal character of this variety in the boxes below.

Place a zero in first box (e.g. or) when number is either 99 or less.

1. PLANT HABIT AT GREEN SHELL STAGE: <input type="text" value="2"/> 1 = ERECT 2 = SEMIERECT 3 = PROCUMBENT 4 = PROSTRATE		2. PLANT SIZE: <input type="text" value="5"/> <input type="text" value="0"/> CM. HIGH AT MATURITY	
3. STEM COLOR: <input type="text" value="1"/> 1 = GREEN 2 = PURPLE		4. NODE COLOR: <input type="text" value="1"/> 1 = GREEN 2 = PURPLE	
5. FOLIAGE: <input type="text" value="2"/> 1 = OPEN 2 = COMPACT		6. LEAF COLOR (See Reverse): <input type="text" value="3"/> 1 = LIGHT GREEN 2 = MEDIUM GREEN 3 = DARK GREEN	
7. LEAF SURFACE: <input type="text" value="2"/> 1 = SMOOTH 2 = BLISTERED		<input type="text" value="2"/> 1 = DULL 2 = GLOSSY	
8. FLOWER COLOR (See Reverse) <input type="text" value="4"/> 1 = PURPLE 2 = LAVENDER 3 = TINGED 4 = WHITE		9. FIRST FLOWERING <input type="text" value="4"/> <input type="text" value="5"/> NUMBER OF DAYS	
10. POD: <input type="text" value="3"/> PLACEMENT: 1 = BELOW FOLIAGE 2 = ABOVE FOLIAGE 3 = AT FOLIAGE LEVEL <input type="text" value="1"/> <input type="text" value="5"/> CM. LONG <input type="text" value="0"/> <input type="text" value="8"/> MM. WIDE <input type="text" value="1"/> CONstrictions: 1 = NONE 2 = SLIGHT 3 = DEEP <input type="text" value="3"/> COLOR (Green shell maturity): 1 = SILVER-GREEN 2 = GREEN 3 = LIGHT PURPLE 4 = DARK PURPLE <input type="text" value="3"/> COLOR (Dry maturity): 1 = WHITE 2 = STRAW 3 = DRAB 4 = PURPLE <input type="text" value="2"/> CROSS SECTION (Green shell stage-width/height): 1 = (1: <) 2 = (1: >) 3 = (1:1)		<input type="text" value="1"/> LOCATION: 1 = SCATTERED 2 = BUNCHED <input type="text" value="2"/> CURVATURE: 1 = STRAIGHT 2 = CURVED <input type="text" value="2"/> SURFACE (Green shell maturity): 1 = DULL 2 = GLOSSY	
11. SEED: <input type="text" value="1"/> <input type="text" value="5"/> NUMBER OF SEEDS PER POD <input type="text" value="4"/> SHAPE (See Reverse): 1 = KIDNEY 2 = OVATE TO OVOID 3 = CROWDER 4 = GLOBOSE 5 = RHOMBOID <input type="text" value="1"/> <input type="text" value="0"/> MM. LONG <input type="text" value="0"/> <input type="text" value="6"/> MM. WIDE <input type="text" value="6"/> HILAR EYE TYPE: <input type="text" value="1"/> <input type="text" value="1"/> <input type="text" value="4"/> GM. PER 1000 SEEDS <input type="text" value="2"/> COAT: 1 = WRINKLED 2 = SMOOTH <input type="text" value="1"/> COLOR PATTERN: 1 = SINGLE COLOR 2 = PATTERNED 3 = MARBLED 4 = SPECKLED <input type="text" value=""/> PRIMARY COLOR (Single color or basic color): 1 = PURPLE 2 = BLACK 3 = DULL BLACK 4 = BLUE 5 = RED 6 = COFFEE 7 = MAROON 8 = BUFF OR CLAY 9 = PINK 0 = WHITE SECONDARY COLORS PRODUCING THE PATTERN, MARBLING OR SPECKLING (Enter a zero in boxes where the colors do not identify the secondary colors.): <input type="text" value=""/> 1 = PURPLE <input type="text" value=""/> 2 = BLACK <input type="text" value=""/> 3 = DULL BLACK <input type="text" value=""/> 4 = BLUE <input type="text" value=""/> 5 = RED <input type="text" value=""/> 6 = COFFEE <input type="text" value=""/> 7 = MAROON <input type="text" value=""/> 8 = BUFF <input type="text" value=""/> 9 = PINK <input type="text" value=""/> 0 = WHITE			

12. DISEASE (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

<input type="text" value="0"/> FUSARIUM WILT	<input type="text" value="1"/> ROOT KNOT NEMATODE	<input type="text" value="0"/> CHARCOAL ROT	<input type="text" value="0"/> ZONATE LEAF SPOT
<input type="text" value="0"/> RED LEAF SPOT	<input type="text" value="1"/> POWDERY MILDEW	<input type="text" value="0"/> COWPEA CHLOROTIC MOTTLE VIRUS	<input type="text" value="0"/> SOUTHERN BEAN MOSAIC VIRUS
<input type="text" value="1"/> BEAN YELLOW MOSAIC VIRUS	<input type="text" value="1"/> CUCUMBER MOSAIC VIRUS	<input type="text" value="0"/> BEAN POD MOTTLE VIRUS	<input type="text" value="0"/> SOYBEAN CYST NEMATODE
<input type="text" value="0"/> COWPEA YELLOW MOSAIC VIRUS	<input type="text" value="0"/> BACTERIAL CANCER	<input type="text" value="2"/> CERCOSPORA LEAF-SPOT	<input type="text" value="0"/> STING NEMATODE
<input type="text" value="0"/> RUST	<input type="text" value="0"/> SOUTHERN BLIGHT	<input type="text" value="0"/> ROOT ROT	<input type="text" value=""/> OTHER (Specify) _____

13. INSECT (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

<input type="text" value="0"/> MEXICAN BEAN BEETLE	<input type="text" value="0"/> COWPEA APHID	<input type="text" value="2"/> COWPEA CURCULIO	<input type="text" value="0"/> STINK BUGS
<input type="text" value="0"/> LESSER CORNSTALK BORER	<input type="text" value="0"/> EUROPEAN CORNBORER	<input type="text" value="0"/> CORN EARWORM	<input type="text" value="0"/> BEET ARMYWORM
<input type="text" value="0"/> THRIPS	<input type="text" value="0"/> SERPENTINE LEAF MINERS	<input type="text" value=""/> OTHER (Specify) _____	

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant size	'Conch'	Plant habit	'Conch'
Pod size	'Conch'	Plant pigmentation	'Lady'
No. days to maturity	'Texas Cream 40'	Seed coloration	None

INSTRUCTIONS

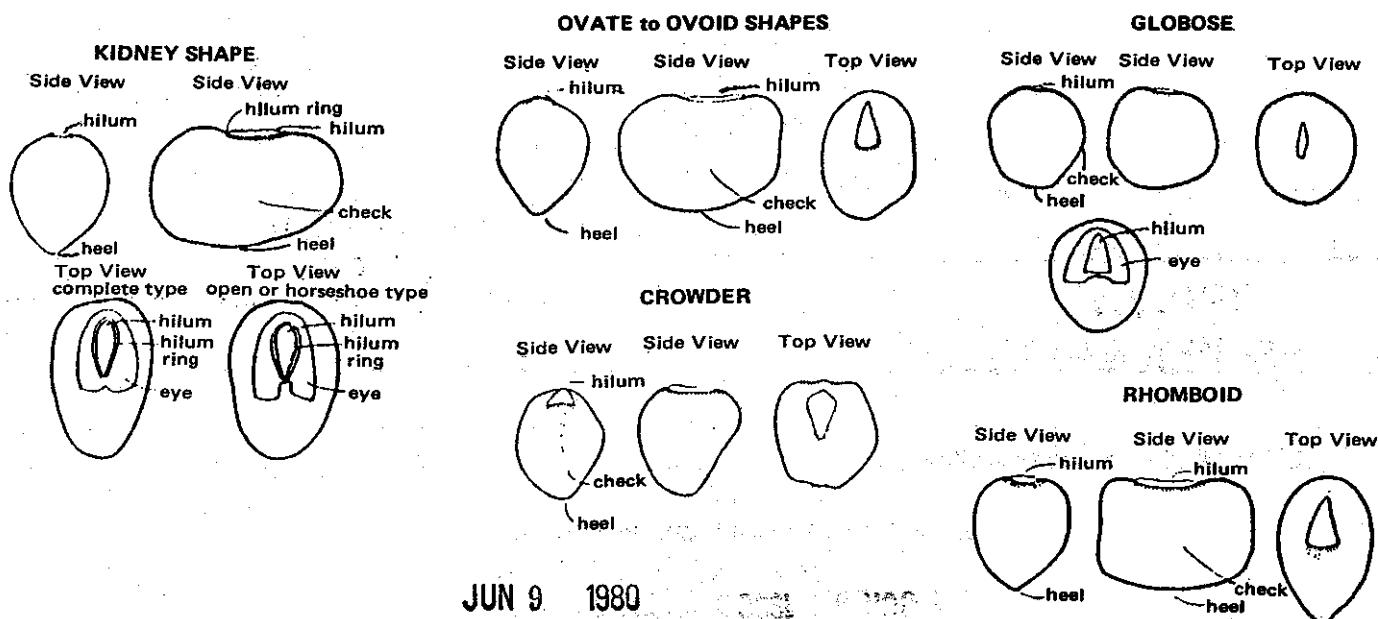
GENERAL: The following publications may be used as a reference aid for completing this form:

1. C. V. Piper, 1912, Agricultural Varieties of Cowpea and Related Species, U.S.D.A., Bulletin No. 229.
2. L. L. Ligon, 1958, Characteristics of Cowpea Varieties, Oklahoma State University, Bulletin B-518.
3. W. J. Spillman and W. J. Sando, 1929, Mendelian Factors in the Cowpea, papers of the Michigan Academy of Science, Arts and Letters, Vol. XI.

LEAF COLOR: Any recognized color chart may be used to determine the leaf color of the described variety. The following cowpea varieties may be used as a guide to identify colors listed:

1. Light Green - Texas Cream 40
2. Medium Green - Big Boy
3. Dark Green - California Blackeye #5.

FLOWER COLOR: White flower should be treated with a one percent solution of hydrochloric acid to determine if anthocyanin is present. If color appears as a result of the test, classify as tinged.

TERMS USED TO DESCRIBE SHAPES:

JUN 9 1980

8000131

13C. Exhibit C.

Note on the Objective Description form under item No. 11, Seed: that GREEN is not listed as a primary color, therefore I have left that box blank.

Green Seedcoat: A Mutant in Southernpea of Value to the Processing Industry¹

O. L. Chambliss²

Auburn University Agricultural Experiment Station
Auburn, Alabama

Abstract. Green seedcoat, a mutant discovered in a normally white-seeded breeding line, Ala. 963.8, of southernpea, *Vigna unguiculata* (L.) Walp. is controlled by a single recessive gene. The green seedcoat, which persists to dryness, results in a product uniform in color with improved consumer appeal in the frozen pack.

Processors who pack southernpeas, especially in the frozen trade, have expressed the need for a cultivar which retains its green color regardless of its stage of maturity. It is thought that consumer appeal would be enhanced by a uniformly green color in the frozen pack. There would also appear to be some demand on the fresh market. Southernpeas have appeared in the fresh produce display with green food coloring added in an attempt to convey a uniformly colored product.

Green seedcoat characters have been described in common beans (3), snapbeans (1, 4), and Lima beans (8). The discovery of a green cotyledon mutant in Lima beans was followed by the development of several green seeded cultivars that have become popular in the frozen pack (7, 9) thus enhancing their consumer appeal.

Seedcoat color has been thoroughly researched in *Vigna*. One review (10), and other research publications (2, 5, 6) describing a diversity of genetic material, list 15 genes conditioning 8 seed colors, but none classified as green.

This paper reports the discovery and mode of inheritance of a green seedcoat character in southernpeas.

The green seeded parent used in the inheritance study came from a dry seed with a green seedcoat [light olive (10 y 5/5) in the Nickerson color chart] discovered in a 'Lady' type breeding line, Ala. 963.8, which is normally white seeded. This line is of uncertain origin, but it derives from the breeding program of Isbell (5) and his associates.^{3,4} It is thought that the parental background included 'Lady', 'Conch', and possibly some purple hull

cultivars (personal communication, C. L. Isbell).

The progeny derived from the single green seed proved to be homozygous for green seedcoat. A white seed selected from the same seed stock was tested and found to be homozygous white. Thus green and white selections from the same stock were used as parents for the inheritance study. Seed of F₁, F₂, and backcross progenies were obtained in the greenhouse. Due to the limited seed supply of some of the populations and the danger of loss in the field all the plants were grown in 20 cm clay plots in 1 peat:1 sandy loam sterilized soil mix. Pods were harvested from each plant individually as the pods dried. Care was taken to harvest pods the day they dried to avoid confusion between white seed and green seed bleached white by the sun over a period of time.

All the plants in the F₁ and in the backcross to the white seeded parent produced white seedcoats (Table 1), indicating that the green seedcoat character is recessive to white. Segregation ratios of 1:1 in the backcross to the green seedcoat parent and 3 white:1 green in the F₂ generation indicate that the green seedcoat character is due to a single recessive gene. The symbol *gt* (green testa) is proposed for the gene which in the homozygous recessive state results in a persistent green seedcoat; *Gt* results in a white seedcoat. These results are similar to those of previous studies dealing with seedcoat color in Lima beans (8) and snap beans (4). In both crops single homozygous recessive genes controlled green seedcoat color.

Green seeded derivatives of certain white seeded cultivars should be readily developed unless there are epistatic interactions when crosses are made with lines having additional genes for color. The green seedcoat character may only

be used where it is desired to retain a green color in a seed that is largely white at dry maturity, e.g., in creams and blackeyes. It is anticipated that the genetics of green seedcoat may be more complex in crosses with types having seedcoat colors than cream (colorless). The effect that genes for eye color may have on the green seedcoat is unknown.

Observation of the growth habit and other plant characteristics of the green-seeded line indicates that the green seed character is due to a single gene. Other characters remained relatively unchanged from the original line Ala. 963.8.

The green mutant selection is productive and has a good potential for producing a product with the quality of cream type southernpeas. In addition to edible quality, the green color of the processed product is greatly enhanced both in intensity and uniformity. Seed have been increased and the line should be released in the near future.

Literature Cited

- Dean, L. L. 1968. Progress with persistent-green color and green seed-coat in snap beans (*Phaseolus vulgaris* L.) for commercial processing. *HortScience* 3:177-178.
- Faris, D. G. 1965. The origin and evolution of the cultivated forms of *Vigna sinensis*. *Can. J. Gen. Cytol.* 7:433-452.
- Hendrick, U. P., W. T. Tapley, G. P. Van Eseltine, and W. D. Enzine. 1931. The vegetables of New York. Part II: Beans of New York, Vol. I. J. B. Lyon Co., Printers, Albany, N.Y.
- Honma, S., J. D. Bouwkamp, and M. J. Stojanov. 1968. Inheritance of dry pod color in snap beans. *J. Hered.* 59:243-244.
- Isbell, C. L. 1959. Southern table peas. Ala. Agr. Expt. Sta. Bul. 317.
- Ligon, L. L. 1958. Characteristics of cowpea varieties *Vigna sinensis*. Okla. State Univ. Expt. Sta. Bul. B-518.
- Magruder, R., and R. E. Wester. 1941. Green cotyledon, a new character in the mature Lima bean (*Phaseolus lunatus* L.). *Proc. Amer. Soc. Hort. Sci.* 38:581-584.
- Tucker, C. L. 1965. Inheritance of white and green seed-coat colors in Lima beans. *Proc. Amer. Soc. Hort. Sci.* 87:286-287.
- Wester, R. E. 1965. Green cotyledon in Lima beans its origin and development. *Seed World* 96(11):30.
- Yarnell, S. H. 1965. Cytogenetics of the vegetable crops. IV. Legumes. *Bot. Rev.* 31:300-311.

Table 1. Inheritance of seed coat color in a cross of white x green in southernpeas.

Generation ²	No. of plants			X ²	P	Proposed genotype and ratio
	White	Green	Total			
P _w	7	0	7			<i>Gt Gt</i>
F ₁	8	0	8			<i>Gt gt</i>
F ₁ × P _w	10	0	10			all <i>Gt</i> —
F ₁ × P _g	4	5	9		0.25 ^y	1 <i>Gt gt</i> :1 <i>gt gt</i>
F ₂	35	13	48	0.111	.50—.75	3 <i>Gt</i> —: 1 <i>gt gt</i>
P _g	0	10	10			<i>gt gt</i>

²P_w = white parent, Ala. 963; P_g = green parent, mutant from Ala. 963.8.

^yProbability determined from expansion of the binomial (a + b)⁹.

¹Received for publication December 27, 1973.

²Associate Professor, Department of Horticulture.

³Jones, S. T. 1952. Improvement of the southernpea with respect to plant characteristics, yield, and quality. M.S. Thesis, Auburn Univ., Auburn, Alabama.

⁴Norton, J. D. 1955. Southernpea breeding for improved plant characteristics including yield, quality, and root-knot nematode resistance. M.S. Thesis, Auburn Univ., Auburn, Alabama.

'Freezegreen' Southernpea¹

Oyette L. Chambliss²Auburn University Agricultural Experiment Station, Auburn,
AL 36830Additional index words. *Vigna unguiculata*, vegetable breeding

'Freezegreen' southernpea, (*Vigna unguiculata* (L.) Walp.) has been released by the Auburn University Agricultural Experiment Station to fill a need in the processing industry for a cultivar which maintains its green seed color to maturity. 'Freezegreen' should have added consumer appeal because of a more uniformly green frozen pack and an enhanced green color.

Origin

'Freezegreen' originated from a single dry seed with a green seed coat which appeared in a bulked seed lot of the white-seeded breeding line Ala. 963.8. Ala. 963.8 is derived from the breeding program of Dr. C. L. Isbell and it is of uncertain origin, but the parental background probably included 'Lady' and 'Conch'. The persistent green color of its seed coat (testa) is controlled by the recessive gene *gt* (1).

Description

The mutation resulting in the green seed coat character of 'Freezegreen' did not change other characteristics of the original line, Ala. 963.8. The plant has a low bushy growth habit with spreading basal branches, but no terminal vines. Pods are straight to slightly curved, about 15 cm. long, and are positioned level with or above the foliage. Pod color ranges from green with a tinge of purple to solid purple at the mature green stage. Seeds are small and globose in shape (Fig. 1). The dry seed color matches Light Olive (10y 5/5) in the Nickerson color chart (3). 'Freezegreen' has the same level of cowpea curculio resistance as Ala. 963.8. It also appears to have the same resistance to *Cercospora* leaf spot as the parent line, Ala. 963.8 (2). 'Freezegreen' is susceptible to root knot nematodes and mosaic viruses.

'Freezegreen' can be harvested by the green pea combine. Combine shell-out is good; the color of the uniformly green peas is excellent. 'Freezegreen' is

productive and has a good potential for producing a product with the quality of a cream type southern-pea. Yields in both multiple and once-over harvest trials are competitive with similar cultivars used commercially. In some cases yield of 'Freezegreen' is not significantly different from the crowder type, 'Mississippi Silver' used as a yield standard for commercial cultivars (Table 1).

The release of 'Freezegreen' will benefit not only the vegetable processing industry, but also gardeners. It has characteristics which appeal to gar-

deners: a slightly larger seed of the 'Lady' type, a purple hull, easy to hand harvest, produces over a long period of time, and may be harvested repeatedly. Unlike 'Lady', it is very easy to shell. The enhanced green color should have appeal on the table. Since unshelled 'Freezegreen' peas have a short shelf life, the cultivar is not well suited for the fresh market industry.

Availability

Seed should be available from wholesale seed dealers in Alabama no later than 1980.

Literature Cited

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3. Nickerson color fan, maximum chroma, 40 hues. 1957. Munsell Color Co. Baltimore, Md.

Table 1. Average yield of 'Freezegreen' compared to commercial cultivars of southernpeas in the Southern Cooperative Trial at Auburn, Alabama, 1976-77.

Cultivar	Yield (kg/ha) ²							
	Multiple harvest				Once-over harvest			
	1976		1977		1976		1977	
	In-pod	Shelled	In-pod	Shelled	In-pod	Shelled	In-pod	Shelled
Mississippi Silver	6615a	3601a	6122a	2453a	4568a	2886a	4893a	3258a
Pinkeye Purple Hull	6706a	3245ab	4716a	2303a	5223a	2876a	3224a	1517b
White Acre	5026b	2945b	—	—	2225b	1154b	—	—
Freezegreen	5018b	2473b	3931a	2051a	3662a	1621b	4675a	2155b

²Mean separation in columns by Duncan's Multiple Range test, 5% level.

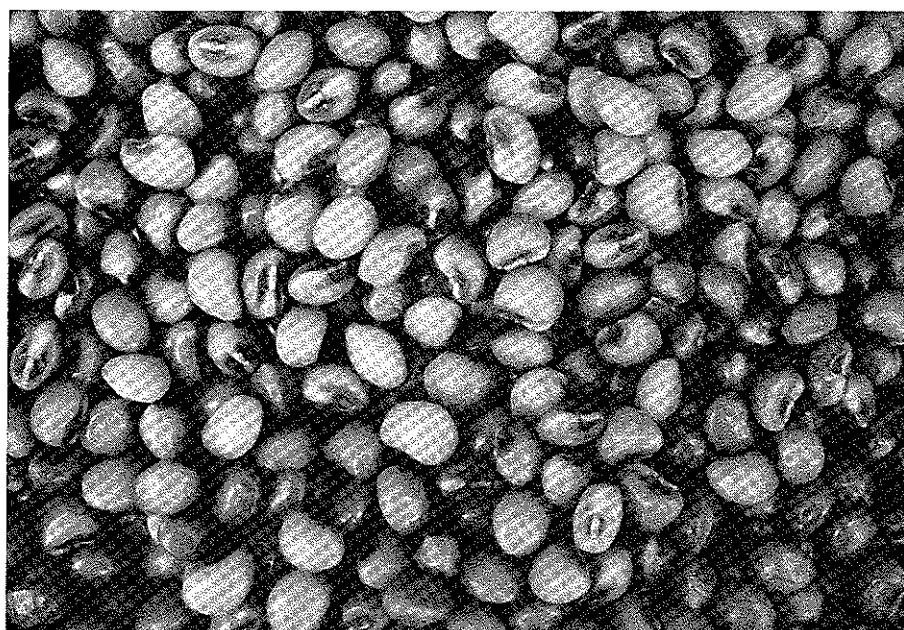


Fig. 1. Seed of 'Freezegreen' harvested at the mature green stage and blanched in preparation for freezing.

¹Received for publication October 15, 1978. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper must therefore be hereby marked advertisement solely to indicate this fact.

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